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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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12/23/2004

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EXAMINER

GREENE JR, DANIEL LAWSON

ART UNIT	PAPER NUMBER
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3641

DATE MAILED: 12/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/661,847	Applicant(s) BOARDMAN ET AL.	
	Examiner Daniel L. Greene Jr.	Art Unit 3641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 November 2004.
 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 15-20 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) ☐ Claim(s) _____ is/are allowed.
 6) ☒ Claim(s) 1-13 and 15-20 is/are rejected.
 7) ☐ Claim(s) _____ is/are objected to.
 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
 10) ☒ The drawing(s) filed on 16 November 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's cancellation of claim 14 is acknowledged.

Response to Arguments

2. Applicant's arguments see page 9 of remarks filed, 11/16/2004, with respect to the drawings showing every feature of claims 1, 5 and 13 have been fully considered and are persuasive. The objection, to the drawings showing every feature of claims 1, 5 and 13, has been withdrawn.
3. However, applicant has failed to address the objection of claim 17 as discussed more fully below.
4. Applicant's arguments, see page 9 of remarks filed, 11/16/2004 with respect to the specification regarding paragraphs 0020, 0023, 0026, 0029 and Figure 7, have been fully considered and are persuasive. The objection, of paragraphs 0020, 0023, 0026, and 0029, has been withdrawn.
5. However applicant's amendment to paragraph 0030 reintroduces objectionable material addressed more fully below.
6. Applicant's arguments, see page 9-12 of remarks filed, 11/16/2004 with respect to the 112, 1st and 2nd rejections of claims 1, 5-9, and 13-16 have been fully considered and are persuasive. The 112 1st and 2nd rejections of claims 1, 5-9, and 13-16 have been withdrawn.

7. Applicant's arguments filed 11/16/2004 in regards to the 102 and 103 rejections of the Office Action mailed 9/16/2004 have been fully considered but they are not persuasive.

8. With regard to the 102 Rejection of claims 1-6 and 13-15, applicant argues that Anthony (U.S. Patent 4,127,445) does not describe nor suggest an apparatus for supporting fuel assemblies as recited in Claim 1. More specifically, Anthony does not describe nor suggest an apparatus having a removable support plate including at least one groove configured to mate with a support beam. Rather, in contrast to the present invention, Anthony describes a support structure having a plurality of support beams, metal pads, and alignment pins, wherein fuel assemblies are supported and aligned by the pads and pins. Specifically, alignment posts extend downward from a lower end plate of the fuel assemblies and a bottom surface of the alignment posts rest on a top surface of the pads. Accordingly, for the reasons set forth above, Applicants submit that Claim 1 is patentable over Anthony.

This is not persuasive because Anthony clearly discloses all of the limitations of claims 1-6 and 13-15 as detailed in the Office Action mailed 9/16/2004. Wherein it is understood that the "protrusion" or "pads and pins" are integral with and part of the plurality of support beams and as admitted by applicant, the alignment posts (i.e. grooves), which are integral with and part of the support plate (which is removable), are therefore configured to contact and mate with one of said plurality of support beams.

Applicant argues that Anthony discloses fuel assemblies supported and aligned by alignment pins and that the lower end plate (54) is integral to the fuel assembly,

however said plates are removable from both the core and the fuel assembly support plates and perform and disclose all the functions of applicant's invention. Therefore applicant's argument is not persuasive and the previous rejection stands and by reference is incorporated herein.

With respect to arguments directed to claims 13-15, applicant is again reminded that the "support plate (54)" is clearly removable from both the fuel assembly AND the reactor core, and said support plate (54) does comprise "at least one groove (62) configured to mate with one of the plurality of support beams (the combination of 19, 21, 22, and 23)" as previously described in the aforementioned office action.

9. With regard to the 102 Rejection of claims 9 and 12 (see pages 14 and 15), applicant argues that 62-5197 does not describe nor suggest a support plate as recited in Claim 9. More specifically, 62-5197 does not describe nor suggest a support plate including a bottom surface having at least one groove configured to locate the support plate along a support beam. Rather, in contrast to the present invention, 62-5197 describes a support-assembly for supporting a fuel assembly, wherein the support assembly coupled to flow passages of adjacent support pieces, and wherein the support assembly includes a fuel assembly opening configured to be coupled to and support a fuel assembly.

This is not persuasive because 62-5197 clearly discloses all of the limitations of claims 9 and 12 as detailed in the Office Action mailed 9/16/2004 and incorporated herein by reference. Applicant is directed to figures 3, 4, 7, 8a, 8b, and 9 wherein it is shown that the support plate (10) including a bottom surface (area near flow passages

((11)) has a circumferential groove (not labeled in Figures 4 or 7, but considered to be the line in the area between items ((13) and (11)) configured to locate the support plate along a support beam ((6) or (106)).

10. Applicant's arguments pertaining to the 103 Rejections of claims 1-9 (see pages 15-17) are not persuasive for the same reasons set forth above as well as the motivations set forth below. Applicant states that the examiner presents no motivation other than applicants own teaching to combine references, however as indicated by the examiner, applicants invention is no more that the use of conventionally known techniques, designs and layouts available to the art as proved by the references listed on the PTO-892 mailed on 9/16/2004. Further as stated in the previous office action sections 8-11 and disclosed in Chaki, Drecker, Berglund, etc., it is well known in the art to be motivated by reduced flow restriction, ability to throttle or adjust flow, stronger flow, lower coolant flow impedance, improved thermal margin, etc. Therefore the examiner has presented multiple motivations from various references indicative of the motivations of those of ordinary skill in the art.

11. Applicant's arguments pertaining to the 103 Rejections of claims 10 and 11 (see pages 17-18) are not persuasive for the same reasons set forth above as well as the following.

The Examiners citation of U.S. Patent 3,888,732 to Berglund et al. is merely to prove that it is old and well know in the art to vary the shape of the support plate from round to square as such results are in no more than the use of conventionally known methods, techniques, designs and layouts available within the art.

12. Applicant's arguments pertaining to the 103 rejections of claims 13 - 20 (see pages 18 - 20) are not persuasive for the following reasons:

Anthony discloses applicant's invention as described above. Applicant's argument's in the combination of Chaki in view of Anthony, and the combination of Chaki in view of Anthony and further in view of Drecker are all based upon the supposed defect of Anthony, i.e. a removable support plate including at least one groove configured to mate with a support beam, which has been fully addressed above. Since the argument that Anthony does not disclose applicants invention as claimed is not persuasive for the reasons stated above, all reasons and rejections are deemed proper and valid and are hereby incorporated herein by reference.

It is believed that all applicant's arguments have been addressed, therefore an office action based on the merits of the instant application is as follows.

Drawings

13. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore the statement that a flow outlet extends (underlining added) on an opposite side of a removable support block in claim 17, must be shown or the features canceled from the claims. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure

number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

14. The disclosure is objected to because of the following informality, the phrase "control rod guide tubes 56" in paragraph 0030 line 1 is not shown in the drawings. Applicant was directed to correct this deficiency in paragraph 0020, which was accomplished for said paragraph, however applicant reintroduced this error in paragraph 0030 during amendment dated 1/16/2004. *Appropriate correction is required.*

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

15. Claim 17 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention for the reasons set forth below.

The specification fails to disclose a flow outlet extending on an opposite side to the inlet flow projection. The specification discloses a flow outlet on an opposite side to the inlet flow projection however the flow outlet does not extend. The flow outlet is internal to the support block and does not extend therefrom.

Claim Rejections - 35 USC § 102

16. Claims 1-6, 13 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 4,127,445 to Anthony.

Anthony clearly discloses an apparatus for supporting fuel assemblies (16) in a reactor pressure vessel (12) including a core (14) comprising a plurality of support beams (19 and 21) and at least one removable support plate (54) disposed on said plurality of support beams (19 and 21), each said removable support plate (54) comprising at least one groove (4 grooves labeled (62)) configured to mate with one of said plurality of support beams (via beam/protrusion combination 19, 21, 22, and 23), wherein said at least one removable support plate (54) and said plurality of support beams (19 and 21) form a core support (18) comprising a support ring (29) having an inner periphery and an outer periphery, said plurality of support beams (19 and 21) extending between said inner periphery, and said plurality of support beams (19 and 21)

intersecting one another to form a support beam matrix wherein said at least one removable support plate (54) is configured to be removed from above the core and each of said plurality of support beams (19 and 21) comprise a protrusion (the combination of 22 and 23) extending along a length thereof (see figure 2), said protrusion (the combination of 22 and 23) receivable within said at least one groove (62) (See Figures 3 - 6) wherein said at least one removable support plate (54) comprising at least one support plate flow passage (in Figures 1-6, and column 2 lines 67+, column 3 lines 1-7, and 50+, column 4 lines 26-45 and column 6 lines 35-45 and column 7.

17. Claims 9, and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Japanese Patent 62-5197.

62-5197 discloses a support plate (10) comprising a top surface, a bottom surface spaced apart from said top surface by a thickness, said bottom surface having at least one groove configured to locate said support plate along corresponding support beams ((6) or (106)); a guide tube opening (12) through said thickness; and at least one flow passage (11 and 13) through said thickness, in figures 3, 4, 7, 8, and 9 wherein it is understood that given the broadest interpretation of the claim, as viewed from the side as shown in Figures 4 and 7, the groove is circumferentially located between (13) and (11) as indicated in Figures 4 and 7 which is indeed part of said bottom surface and that the terms "comprising" and "configured" when also interpreted in the broadest meaning includes the fact that this groove can be "configured" to do other things besides what applicant intends including assisting in locating the support plate during installation or

configured to locate said support plate along corresponding support beams in order to weld and therefore attach said plate to said support beams, etc.

In regard to claim 12, 62-5197 further discloses a removable support block ((5) and/or (16)) having a flow inlet portion (9) extending from one side of said removable support block, said flow inlet portion providing flow communication to another side of said removable support block, said flow inlet portion receivable within said at least one flow passage (13) in figures 5 and 8.

Claim Rejections - 35 USC § 103

18. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anthony in view of Japanese Patent 62-5197.

Anthony discloses applicant's invention as described above. Anthony does not expressly disclose a removable support block disposed on the removable support plate, wherein said removable support block has at least one support block flow passage in flow communication with said at least one support plate flow passage.

62-5197 as also described above discloses a removable support block with at least one removable support block flow passage in flow communication with said at least one support plate flow passage in figures 2,4,5,7 and 8.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to replace the single support plate (Anthony (54)) with the support plate and support block configuration of 62-5197 in order to gain the advantages therefrom (i.e. reduced flow restriction, improved thermal margin, lower coolant flow impedance,

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etc.,) as such results are in no more than the use of conventionally known techniques, designs and layouts available within the art.

Note that MPEP 2144 states that making separable, rearrangement of parts, duplication of parts and/or changing the shape does not make an invention patentably distinct. See *In re Dulberg*, 289 F.2d 522, 523, 129 USPQ 348, 349 (CCPA 1961), *In re Japikse*, 181 F.2d 1019 86 USPQ 70 (CCPA 1950) and *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975), *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960), *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)

62-5197 further discloses claim 8 in the rejection of corresponding parts above.

19. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anthony as modified by 62-5197 above, and further in view of U.S. Patent 3,888,732 to Berglund et al. hereafter Berglund.

Anthony as modified by 62-5197 above, discloses applicants invention as described, however Anthony as modified does not expressly disclose that the bottom surface has a first, second, third and fourth groove positioned around the guide tube opening.

62-5197 discloses a support plate with a bottom surface having a groove positioned around the guide tube opening, however it does not expressly disclose that the bottom surface has a first, second, third and fourth groove positioned around the guide tube opening.

Berglund teaches that one skilled in the art, after reading the Specification in light of the Figures, is fully knowledgeable that the supporting surface of the supporting

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member of a fuel cell may be round or square in Figures 2 and 3, column 2, lines 11-12, 20-25, and column 3 lines 9-31.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to alter the shape of the support plate of 62-5197 from round to square in order to gain the advantages thereof (i.e. being able to throttle or adjust the flow there through) as such results are in no more than the use of conventionally known methods, techniques, designs and layouts available within the art.

In regard to claim 11, selecting an art level equivalent square shape of the support plate of 62-5197 inherently causes said groove to take on a square shape which causes at least two of said first groove, second groove, third groove and fourth groove to extend along said bottom surface substantially parallel to each other and one end of at least one of said first groove, second groove, third groove and fourth groove to intersect with at least one of said first groove, second groove, third groove and fourth groove, in the rejection of corresponding parts above.

Note that MPEP 2144 states that rearrangement of parts, duplication of parts and/or changing the shape does not make an invention patentably distinct.

See In re Japikse, 181 F.2d 1019 86 USPQ 70 (CCPA 1950) and In re Kuhle, 526 F.2d 553, 188 USPQ 7 (CCPA 1975), In re Harza, 274 F.2d 669, 124 USPQ 378 (CCPA 1960), In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)

20. Claims 13 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,141,397 to Chaki et al. hereafter Chaki in view of Anthony.

Chaki discloses a nuclear reactor comprising a reactor pressure vessel (8); a reactor core (1) located inside said reactor pressure vessel (8); and a core plate (6) located inside said reactor pressure vessel (8) and at least one removable support plate (10) disposed on said core plate (6), each said removable support plate (10) comprising at least one groove (See Figure 2) configured to mate with said core plate (6), in Figures 1 and 2, column 1 lines 8-17, and column 7 lines 8-24. Chaki does not expressly disclose that the core plate comprises a plurality of support beams.

Anthony teaches a core plate comprising a plurality of support beams and at least one removable support plate disposed on at least one of said plurality of support beams as previously explained above.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to employ the core support structure of Anthony in the nuclear reactor of Chaki in order to gain the advantages thereof (i.e. stronger, lower coolant flow impedance, improved thermal margin, etc.) as such results are in no more than the use of conventionally known methods, techniques, designs and layouts available within the art.

Chaki further discloses claim 15 in Figure 2.

Chaki further discloses claim 16 wherein the removable support plate (10) comprises at least one removable support block ((16) known in the art as a transition piece or tie plate) comprising at least one support block flow passage in flow communication with said support plate flow passage in Figures 1, 2, 4, 6 and 7.

Chaki further discloses claim 17 wherein the removable support block (16) comprises an inlet flow projection extending from one side and receivable within said support plate flow passage in Figure 7.

Chaki also discloses claim 18 in Figures 6 and 7.

21. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chaki as modified by Anthony above and further in view of U.S. Patent 5,943,385 to Drecker et al. hereafter Drecker.

Chaki as modified above discloses applicants inventions substantially as claimed and described above, however Chaki as modified does not expressly disclose that said internal flow passage directs flow into a first channel and a second channel, said first channel and a second channel located within said at least one removable support block (also known in the art as a transition piece or tie plate.)

Drecker discloses a removable support block (the combination of (34) (32) and (35)) wherein said internal flow passage directs flow into a first channel and a second channel and said first channel and a second channel are located within said at least one removable support block, wherein said first channel has a first flow outlet and said second channel has a second flow outlet, in prior art Figure 2, column 4 lines 45+, and column 4 lines

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the transition piece of the prior art disclosed in Drecker in order to gain the advantages thereof (i.e. reduce the pressure drop of the coolant flow) as

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such results are in no more than the use of conventionally known methods, techniques, designs and layouts available within the art.

As previously stated and reproduced here for applicant's convenience, the MPEP 2144 states that a making separable, rearrangement of parts, duplication of parts and/or changing the shape does not make an invention patentably distinct (underlining added). See *In re Dulberg*, 289 F.2d 522, 523, 129 USPQ 348, 349 (CCPA 1961), *In re Japikse*, 181 F.2d 1019 86 USPQ 70 (CCPA 1950) and *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975), *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960), *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)

Conclusion

22. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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23. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure as presenting the current state of the nuclear art in nuclear reactor support structures and configurations.

24. *Examiner's Note: Examiner has cited particular columns and line numbers in the references as applied to the claims below for the convenience of the applicant.*

Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant, in preparing the responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner.


25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel L Greene Jr. whose telephone number is (703) 605-1210. The examiner can normally be reached on Mon-Fri 8:30am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael J Carone can be reached on (703) 306-4198. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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26. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DIG 12/13/2004


MICHAEL J. CARONE
SUPERVISORY PATENT EXAMINER